Test Report n° TR_19179
Rapporto di prova n° TR_19179

Environmental Testing – Cold
Test di Condizionamento Ambientale - Freddo
Ref: test procedure IL22001
Rif: procedura di test IL 22001

Product under testing ***Prodotto testato***	Compact TFT 32” Outdoor		
P/N ***P/N***	993201900100		
Lab Sample ID ***ID campione***	286 A	**Received date** ***Ricevuto il***	29/04/2019
Derived models ***Modelli derivati***	/		
Standard Rev. Date/Ed. ***Standard/Data Revisione/Ed.***	**EN 60068-2-1:2007 – 2nd Ed.** – Environmental testing – Part 2: Tests, Test A: Cold – Test Ad		
Manufacturer ***Costruttore***	AESYS S.p.A. Via Pastrengo 7c 24068 Seriate (BG) Italia Tel: +39.0352924111 www.aesys.com		
Start test date ***Data inizio test***	08/05/2019	**End test date** ***Data fine test***	09/05/2019
First issue ***Prima emissione***	14/05/2019		
Laboratory technician ***Tecnico di laboratorio***	Andrea Vanalli	Firma	
Check and approbation ***Controllo e approvazione***	Fabio Novarini	Firma	
Revision ***Revisione***	/	**Revision date** ***Data revisione***	/

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1 DUT – GENERAL PRODUCT INFORMATION
DUT – INFORMAZIONI GENERALI

The DUT (Device Under Test), named **Compact TFT 32" Outdoor**, is a variable message panel based on TFT technology used for video-information in railway applications.

DUT – Compact TFT 32" Outdoor

DUT – Product identification label

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2 TEST PROCEDURE
PROCEDURA DI TEST

The test was performed according to Aesys internal procedure *IL 22001_Prova A - Freddo.*

3 TEST EQUIPMENT INFORMATION
INFORMAZIONI SULLA STRUMENTAZIONE UTILIZZATA

ID	Description	Model	Manufacturer	Serial n°	Last Calibration Date	Next Calibration Date
48	Climatic room	CH2000D	Angelantoni Industrie	7029	27/02/2019	28/02/2021
112	Data acquisition control unit	MX100	Yokogawa	91N427912	13/06/2017	15/06/2019
290 356	Data acquisition input unit	MX110	Yokogawa	91P527795 91S525693	13/06/2017	15/06/2019
142	Watt meter	WT230	Yokogawa	91F611778	13/06/2017	15/06/2019

4 TEST PARAMETERS
PARAMETRI DI TEST

Test severity level :

Temperature (°C):

☐ -65
☐ -55
☐ -50
☐ -40
☐ -33
☐ -25
☒ -20
☐ -10
☐ -5
☐ +5
☐ Custom:

Duration (h):

☐ 2
☒ 16
☐ 72
☐ 96

Environmental conditions: Temperature range: 15°C to 35°C
Relative humidity: 25 to 75%
Pressure: 860 to 1060 hPa

Test measurements uncertainty: Temperature: ± 1°C

The measurement uncertainties stated in this document are estimated as extended uncertainty obtained multiplying the standard uncertainty by the coverage factor *k* corresponding to a confidence level of about 95%.

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5 TEST SETUP

TEST SETUP

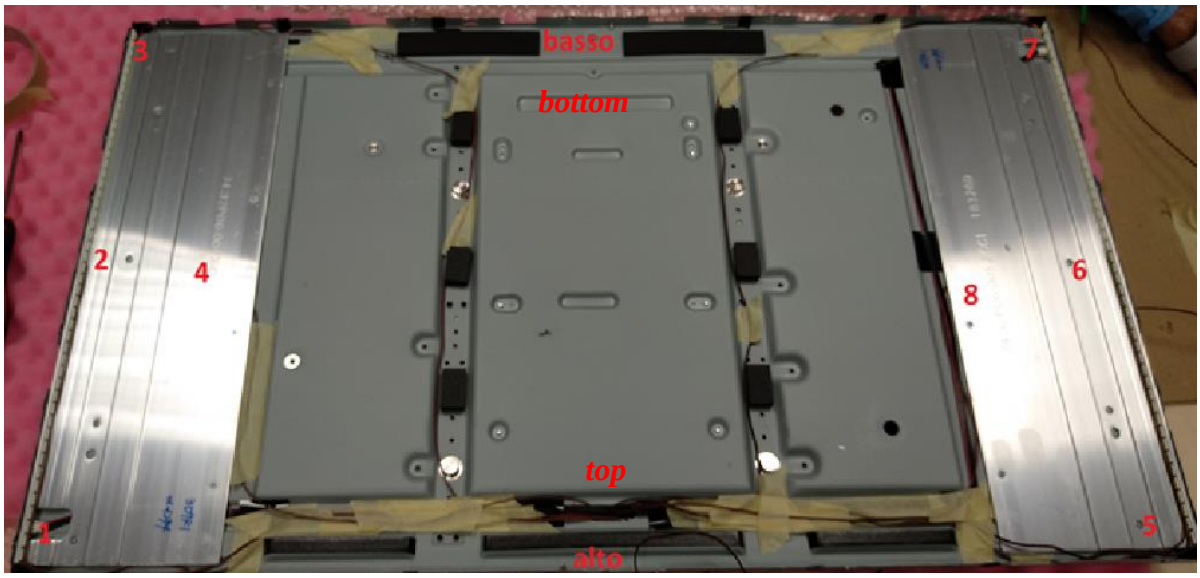
The EUT shall be place in laboratory ambient environment for 24h before introduce it into the test chamber.
Power and communication cables are connected as required for normal operation.
With DUT switched OFF the temperature inside the chamber is decreased to the specified severity, with a rate of change of 1°C/min.
After thermal stability is reached, the DUT is switched ON and it is started the specified duration.
After the time defined for the test, the chamber is gradually raised to +25° ± 3°C and after a recovery time the EUT is removed from the chamber.
The following parameters and behaviour have been monitored:

Parameter/Behaviour	Evaluation criteria
Mechanical check	No mechanical damage, no cracks
Electrical check	No electrical failure, no abnormal power consumption
Display check	Correct visualization of the define image
Communication check	No loss of data communication, data exchanged are correct
Temperature	Temperature below the limit (if present)

List of thermocouples:

Channel	Position
01	TFT backlight top left
02	TFT backlight center left
03	TFT backlight bottom left
04	TFT heat sink left
05	TFT backlight top right
06	TFT backlight center right
07	TFT backlight bottom right
08	TFT heat sink right
09	T-con
10	LED drive
11	Air box
12	1609 board temperature sensor
28	Chamber temperature

The thermocouples are located in the following points:



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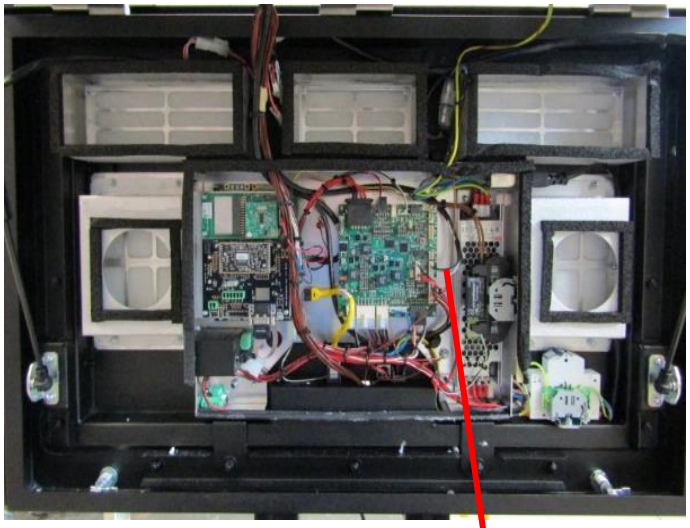

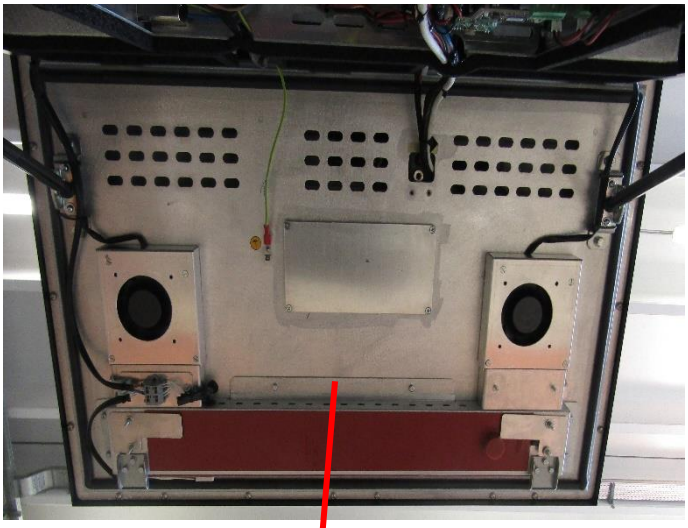

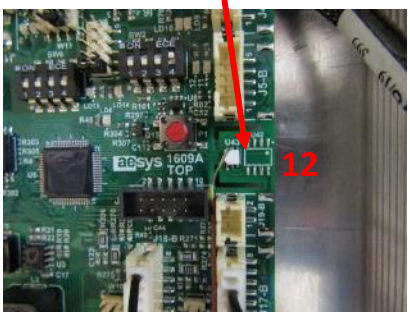

The setup of the test is shown in the following pictures:

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6 TEST RESULTS
RISULTATI DEI TEST

6.1 Environmental conditions
Condizioni ambientali

Test	Performance criteria	Result	Verdict
Environmental temperature	Between +15°C and +35°C	21,7°C	**Pass**
Relative humidity	Between 25% and 75%	45,3%	**Pass**
Pressure	Between 860 and 1060 hPa	1014 hPa	**Pass**

6.2 Startup verification
Verifica iniziale

Test	Evaluation criteria	Result	Verdict
Mechanical check	No mechanical damage, no cracks	No mechanical damage	**Pass**
Electrical check	No electrical failure, no abnormal power consumption	Voltage: / Current: / Power: /	**Pass**
Display check	Correct visualization of the define image	No loss of visualization	**Pass**
Communication check	No loss of data communication, data exchanged are correct	Constant communication	**Pass**
Temperature	Temperature below the limit (if present)	No temperature limit	**Pass**

6.3 End test verification
Verifica al termine del test

Test	Evaluation criteria	Result/Comments	Verdict
Mechanical check	No mechanical damage, no cracks	No mechanical damage	**Pass**
Electrical check	No electrical failure, no abnormal power consumption	Voltage: 222.59V Current: 1.444A Power: 319,20W	**Pass**
Display check	Correct visualization of the define image	No loss of visualization	**Pass**
Communication check	No loss of data communication, data exchanged are correct	Constant communication	**Pass**
Temperature	Temperature below the limit (if present)	No temperature limit	**Pass**

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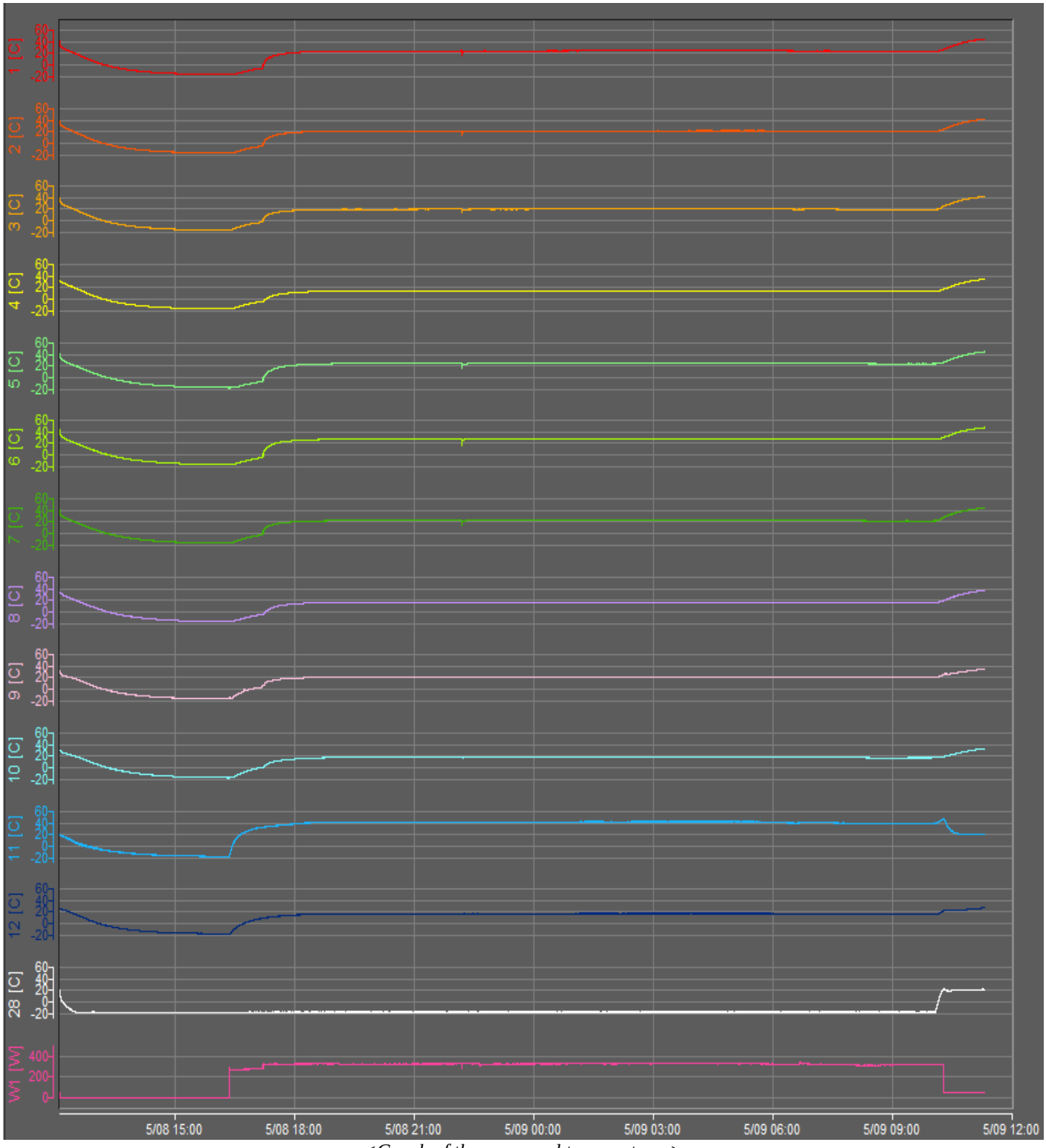
6.4 Test data
Dati del test

The following graph shows the internal temperature, the environmental temperature and the power measured during the entire thermal cycle.



<Graph of the measured temperatures>

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The maximum temperatures are recorded in the table:

Channel	Position	max. temperature measured after steady state, (°C)	Limit (°C)
01	TFT backlight top left	23.8	-
02	TFT backlight center left	21.2	-
03	TFT backlight bottom left	19.3	-
04	TFT heat sink left	13.6	-
05	TFT backlight top right	24.2	-
06	TFT backlight center right	27.1	-
07	TFT backlight bottom right	21.9	-
08	TFT heat sink right	16.4	-
09	T-con	20.5	-
10	LED drive	17.3	-
11	Air box	39.6	-
12	1609 board temperature sensor	16.0	-
28	Chamber temperature	-18.6	-

Test	Evaluation criteria	Result	Verdict
Cold start test	No mechanical and electrical failure No loss of performance No thermal hazard	No mechanical and electrical failure No loss of performance No thermal hazard	**Pass**

6.5 Additional information / Notes:

Informazioni aggiuntive / Note:

END OF TEST REPORT

Fine del test report

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